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Reg. No. : ☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 53203

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Third Semester

Computer Science and Engineering

15UCS303 - COMPUTER ORGANIZATION AND ARCHITECTURE

(Common to Information Technology)

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Component of CPU which is responsible for comparing contents of two pieces of data is   CO1-U

    (a) ALU   (b)CU   (c) Memory   (d) Register

2. CPU gets the address of next instruction to be processed from   CO1-U

    (a) Instruction register   (b) Memory address register   (c) Index register   (d) Program counter

3. Which among the following is the fastest cache mapping function?   CO3-U

    (a) Fully associative mapping   (b) Set associative mapping

    (c) Direct mapping   (d) None of the above

4. Larger page sizes leads to -_____   CO4-U

    (a) Transfer errors   (b) Increase in operation time

    (c) Increase in access time   (d) Decrease in performance

5. In _____ mode, the I/O module and main memory exchange data directly,   CO4-U
   without processor involvement.

    (a) Programmed I/O   (b) DMA   (c) Interrupt-driven I/O   (d) All the above

PART – B (5 x 3= 15Marks)

6. Name the functional units of a computer.   CO1- R

7. Suppose the size of the Main Memory is 16K * 8 bits. What are the sizes of address   CO1-App
   bus and data bus?

8. Define Underflow and Overflow.   CO2- R

9. What would be the effect, if we increase the number of pipelining stages?   CO3- U

10. An address space is specified by 24-bits and the corresponding memory space by   CO4-App
    16-bits:How many words are there in the virtual memory and main memory?

<center>PART – C (5 x 16= 80Marks)</center>

11. (a) Draw and explain block diagram of simple computer with the   CO1- U   (16)
        functional units.

<center>Or</center>

    (b) Why do we use addressing modes ? Explain the different types of   CO1- U   (16)
        Addressing modes with example.

12. (a) Illustrate Booth's algorithm with an example.   CO2-App   (16)

<center>Or</center>

    (b) Demonstrate the division of 1000_2 by 11 using restoring method, draw   CO2-App   (16)
        block diagram and explain the operation.

13. (a) Explain the floating point Add/Subtract rules. With a detailed   CO2- U   (16)
        flowchart explain how floating point addition/subtraction is performed.

<center>Or</center>

    (b) What is a Data hazard? How do you overcome it? And discuss its side   CO3- U   (16)
        effects.

14. (a) Draw and explain the simple combine data path for the MIPS   CO3- U   (16)
        architecture.

<center>Or</center>

    (b) What is a mapping function? What are the ways the cache can be   CO4- U   (16)
        mapped?

15. (a) Explain the virtual memory address translation and TLB with   CO4- U   (16)
        necessary diagram.

<center>Or</center>

    (b) With a neat sketch explain the working principle of DMA.   CO4- U   (16)

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